Blockchain Solutions for the 3Ds of the Energy Industry

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Energy's perfect storm: 3Ds of the energy industry

1D
digitization

decades-old infrastructure is phasing out, must be replaced by modern software and hardware.

2D
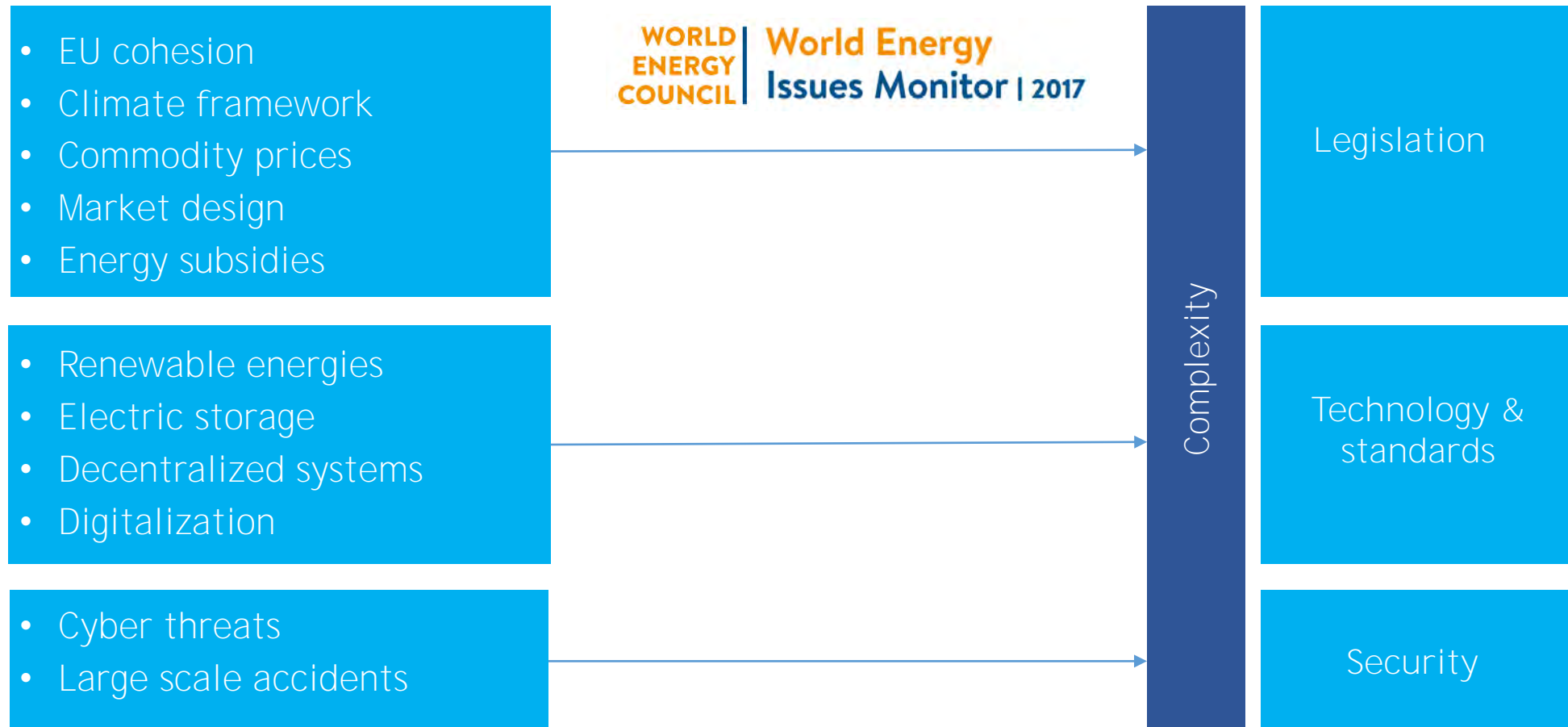### decentralization

Transmission of electricity over long distances is wasteful, emergence of prosumers and prosumagers now encourage microgrids. Additionally countries and their power grids are more interconnected than ever.
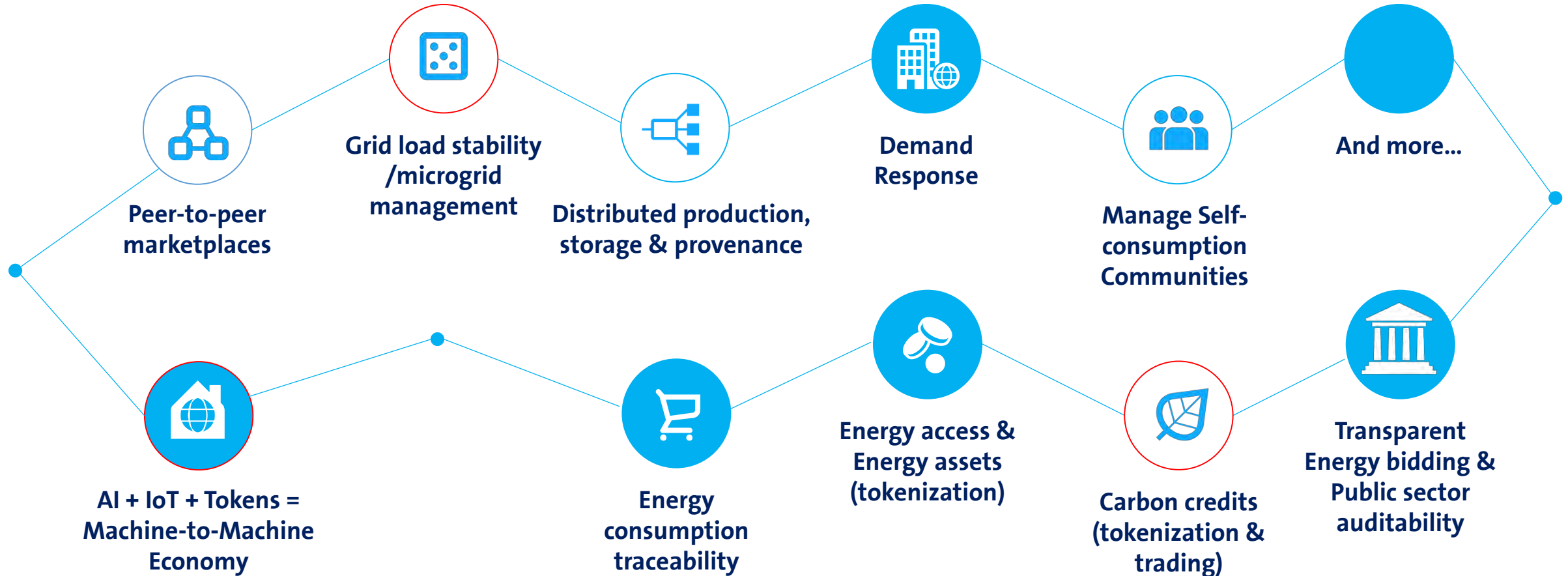
3D
dearbonization

Global initiatives to reduce the effects of global warming are expected to discourage the use of fossil fuels.

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Energy priorities are focused on complexity of issues

A survey by the World Energy Council gathered energy industry leaders to identify the challenges they struggle with
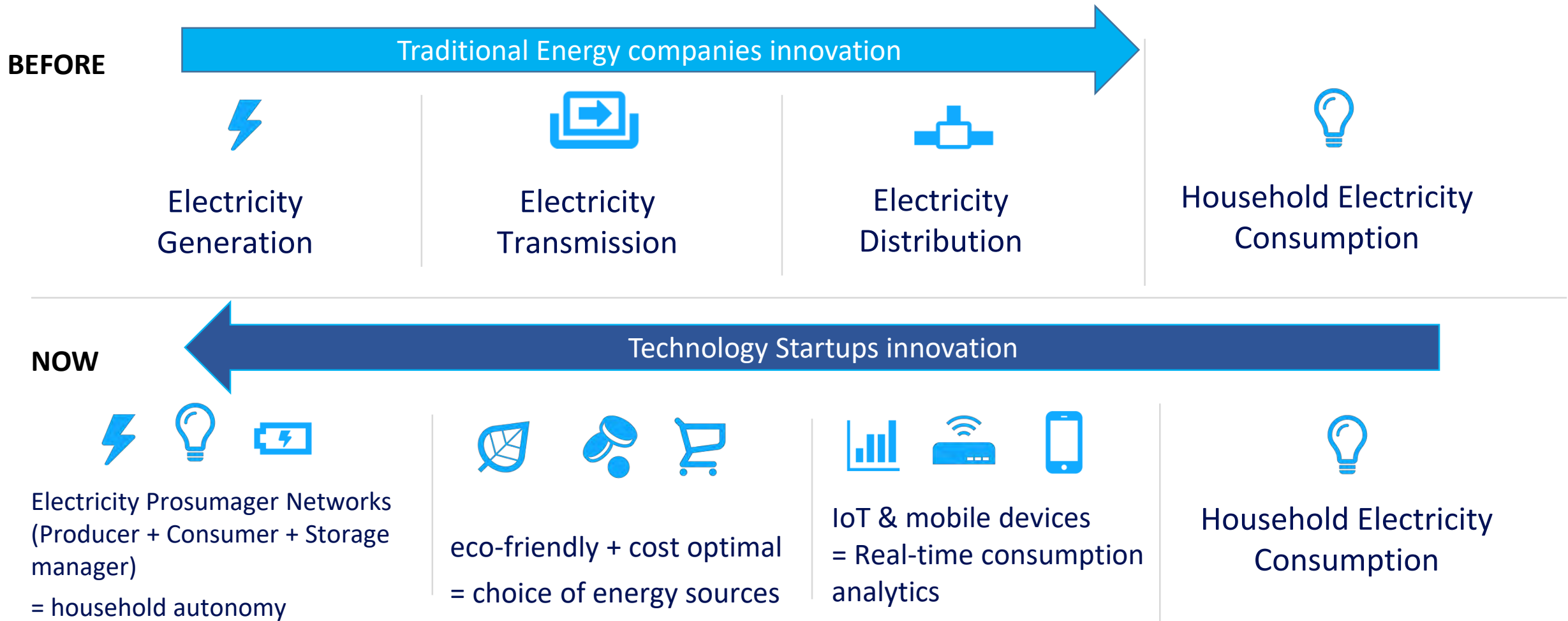
WORLD ENERGY COUNCIL | World Energy Issues Monitor | 2017

- EU cohesion
- Climate framework
- Commodity prices
- Market design
- Energy subsidies

- Renewable energies
- Electric storage
- Decentralized systems
- Digitalization

- Cyber threats
- Large scale accidents

Complexity

Legislation

Technology & standards

Security

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Blockchain use cases in Energy

Peer-to-peer marketplaces

Grid load stability /microgrid management

Distributed production, storage & provenance

Demand Response

Manage Self-consumption Communities

And more...

AI + IoT + Tokens = Machine-to-Machine Economy

Energy consumption traceability

Energy access & Energy assets (tokenization)

Carbon credits (tokenization & trading)

Transparent Energy bidding & Public sector auditability

CASE 1 (DIGITIZATION): Current innovation in energy industry starts with technology startups

BEFORE

Traditional Energy companies innovation

Electricity Generation

Electricity Transmission

Electricity Distribution

Household Electricity Consumption

NOW

Technology Startups innovation

Electricity Prosumager Networks (Producer + Consumer + Storage manager)

= household autonomy

eco-friendly + cost optimal = choice of energy sources

IoT & mobile devices = Real-time consumption analytics

Household Electricity Consumption

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CASE 2 (DECENTRALIZATION): Today's Energy flow (transmission/distribution/management) favors decentralization

It spans cities, regions and countries, **therefore...**

1. Different patterns of production and consumption
2. Information systems are disparate
3. Traditional centralized monitoring is not sufficient

Existing
< 100 MW
100 - 1000 MW
1000 - 2000 MW
2000 - 3000 MW
3000 - 4000 MW
4000 - 5000 MW
5000 - 6000 MW
6000 - 7000 MW
7000 - 8000 MW
8000 - 9000 MW
9000 - 10000 MW
10000 - 15000 MW
> 15000 MW

CASE 2 (DECENTRALIZATION): Today's Energy flow (transmission/distribution/management) favors decentralization

Communes in the borders of a country have more interests in common (like efforts to set/share multiple energy producers) with a commune of the neighbor country than with a commune of the same country.

Existent energy Bottlenecks according to Swissgrid

Source: https://www.swissgrid.ch/swissgrid/en/home/grid/urgent_grid_expansion.html

National Power grids and their Supervisory Control and data acquisition (SCADA)s should be designed with decentralization as a first-class feature. Blockchain can provide the backbone of integration.

CASE 3 (DECARBONIZATION): Certified Emission Reductions (CER)

Voluntary purchase offsets to compensate emissions that you generate through daily life, your travels or your organization.

1. The purchase supports projects validated by the UN.

2. Once the CER are bought (cancellation) they are also "blocked" so it cannot be reused again.

3. The registrar is centralized in the Clean Development Mechanism (CDM) registry operated by the Climate Change Secretariat.

https://offset.climateneutralnow.org/

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CASE 3 (DECARBONIZATION): Certified Emission Reductions (CER)

- The CER is inherently a digital asset that carries perceived value to its buyer/holder.

- The continuity of CERs depends on the existence of a centralized database.

- Tokenizing CERs can be a learning opportunity to design a more transparent carbon credits market exchange.

Recommendations

RECOMMENDATION 1: To facilitate and encourage discussions and agreements for standards of communication in secure IoT as well as blockchain in order to facilitate the integration of technologies; Such advances have the potential to improve lives and reduce costs.

RECOMMENDATION 2: To facilitate and encourage discussions on standards and applications for SCADA integration of neighbor countries through blockchain; Such applications have the potential to improve energy access worldwide.

RECOMMENDATION 3: To use blockchain to tokenize inherently digital assets such as CERs; such an initiative enables us to learn from the technology and apply the lessons learned to other asset-backed markets.

THANK YOU!

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